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GAS ABSTRACTS

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CONTENTS

1. Gas Industry 173
2. Appliances, Domestic 174
3. Combustion: Commercial and Industrial Furnaces..... 175
4. Gasification: Carbonization: Natural Gas Substitutes..... 176
5. Natural Gas and Natural Gas Condensates..... 179
   A. Production and Processing:
   B. Compression and Transmission:
   C. Distribution
6. Petroleum and Synthetic Liquid Fuels..... 182
7. Analytical Methods and Tests..... 183
8. General and Physical Chemistry..... 183
9. Organic Chemistry: Petrochemicals..... 184
10. Chemical Engineering..... 185
11. Process Equipment and Instrumentation..... 186
12. Materials of Construction: Corrosion..... 187

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1. GAS INDUSTRY

Energy Supply

Vaughey, W. M. THE WHITE HOUSE REPORT ON ENERGY SUPPLIES AND RESOURCES POLICY. *Indep. Petrol. Assoc. Monthly*, 25, 23-4, 51-3 (1955) March.

The findings and recommendations of the President's Advisory Committee on Energy Supplies and Resources Policy, released Feb. 26, 1955, is here published verbatim. The Committee recommended that the production, gathering and field sale of natural gas should not be regulated by the federal governent; on taxes: in their present form they have been necessary, and the effect on future development must be considered in connection with any proposed change.

A. E. Neumann

Gas Future

Chandler, M. OUTLOOK FOR GAS INDUSTRY. *Gas Age*, 116, 22-25, 62 (1955) August 25.

Incentives to an expansion of the gas industry, rather than a pessimistic view of dwindling reserves, are emphasized for the benefit of investors. In the long term supply picture, ultimate reserves are certain to be much greater than proved recoverable reserves (211 trillion on Dec. 31, 1954), and reserves will suffice indefinitely as long as discovery exceeds consumption. Also, underground storage to reduce interruptible sales, exploration of continental shelves and of deeper strata, higher gas-oil ratios in discoveries, barge transportation, and a possible 200 trillion reserve in Canada will increase the life of the supply. Production of substitute natural gas from coal by way of synthesis gas through recent advances in technology has indicated gas costs of 4.6 cents per therm (IGT) and 6.5 cents (Lurgi) with modified conventional systems and of 4.5 to 5.5 cents per therm with new unconventional systems. Also, improvements in underground gasification, gasification by nuclear reactor heat and byproduct gas from shales may contribute to such reduced costs that local standby facilities will supplement the pipeline capacity and set a ceiling on pipeline gas costs.

O. P. Brysch

Gas Price Regulation

Wherry, W. M. CAN GAS PRODUCTION BE REGULATED? *Public Utilities Fortn.*, 56, 157-60 (1955) August 4.

The author expresses the opinion that FPC regulations of well-head natural gas prices will not prove to be as disastrous as the producers predict. If the FPC judges each case as an individual problem and acts fairly, the best interests of all parties will be served.

W. G. Bair

Labor and Automation

ROBOT PLANTS: NO BOGY FOR CHEMICAL LABOR. *Chem. Week*, 77, 22-24 (1955) July 2.

The outlook on automation by labor is clarified. It is the concensus of the three large labor organizations in the chemical process industry that the further employment of technological advancements and labor saving techniques will benefit all parties concerned. They point out that if the workers are permitted to share in the higher returns from automation and the industry accepts the responsibility for relocating displaced employees, then labor will not stand in the way of plans for increased mechanization.

J. M. Reid

Production Cost

Hunter, E. E. HOW TO DETERMINE GAS-PRODUCTION COST. *Oil Gas J.*, 54, 219-21 (1955) July 25.

The problem of allocating costs in gas production is discussed, and the techniques developed by Humble Oil and Refining Co. are described and illustrated.

R. F. Bukacek

Records Systems

Alford, E. C. PUTTING NEW LIFE INTO DEAD RECORDS PROGRAM. *World Oil*, 141, 76, 78, 84. July.

How the Warren Petroleum Corporation solved its problem for keeping using and/or discarding records.

C. A. Simms

Selling Service

Wolfe, J. T. SELL GAS AS A SERVICE, NOT A FUEL. *Amer. Gas Assoc. Monthly*, 37, 29, 30, 55 (1955) July-August.

The author favors promotion of sales in indus-

trial as well as in the domestic market by selling gas as a service, rather than just as a fuel. This can be achieved by providing gas-consuming equipment which will give the customer not only a prescribed number of heat units but the maximum degree of convenience, cleanliness, coolness and control. J. R. Hasenberg

Storage Agreements

Rubenstein, S. E. WHAT YOU NEED TO GET STORAGE RIGHTS. *Gas Age*, 115, 37-38 (1955) May 5.

A review of the clauses found in the "average" natural gas storage agreement is presented. Covered are: Types of agreements, "terms" of agreement, the obligations of the lessee, other charges, cancellation rights, border protection, and right of eminent domain. B. E. Eakin

2. APPLIANCES

Burners

Chambers, J. E. (assigned to Chambers Corp.) SUPPORT FOR TOP BURNERS. U.S. 2,712,-818 (1955) July 12.

Squire, H. A. and Sacha, L. A. Jr. (assigned to Perfection Stove Co.) GAS BURNER. U.S. 2,711,215 (1955) June 21.

Controls and Ignition

Hollman, P. I. (assigned to Geo. D. Roper Corp.) OVEN LIGHTING SYSTEM. U.S. 2,-715,940 (1955) August 23.

Mueller, E. H. DOUBLE OUTLET CONTROLLING VALVE WITH POSITION INDICATOR. U.S. 2,711,191 (1955) June 21.

Mueller, F. H., Tinker, E. E. and Rhodes, R. I. (assigned to Mueller Co.) GAS PRESSURE REGULATOR. U.S. 2,710,163 (1955) June 7.

Parrett, W. S. GAS HEATER CONTROL. U.S. 2,710,181 (1955) June 7.

Smith, J. W. (assigned to Minneapolis-Honeywell Regulator Co.) RELAY CONTROL APPARATUS FOR BURNERS AND THE LIKE. U.S. 2,715,939 (1955) August 23.

Zylstra, J. J. and Mueller, J. C. (assigned to Rheem Mfg. Co.) INTERCHANGEABLE VALVE MOUNT FOR GAS HEATER. U.S. 2,709,997 (1955) June 7.

Gas Air-Conditioning

Hood, H. C. GAS MOVES TO CAPTURE THE SUMMER "VOLUME" LOAD: AIR-CONDITIONING. *Butane-Propane News*, 17, 44-48 (1955) July.

The development of gas-fired air conditioning equipment has reached a new acceleration with the advent of domestic gas engine units. The Coleman Company, Cobell Industries and Wood Electric Company have all recently exhibited production models. These and the Servel absorption unit are described as well as some of the current research and problems in the field. (See also *Gas Abs.* 11, 158) J. F. Reed

Gas vs. Oil Heating

Akerman, J. R., Farber, E. A. and Larson, G. L. COMBUSTION EFFICIENCY-CYCLE LENGTH OF DOMESTIC OIL BURNERS. Univ. Wisconsin Eng. Expt. Sta. Report No. 2 (1955) March.

The results of efficiency tests on specific oil burners are presented with consideration of losses including those due to combustible material in stack gases. The efficiencies range from approximately 42% to a maximum of 65% for long on-cycles. The efficiency con be predicted by an empirical equation based on combustion chamber surface temperature.
R. T. Ellington

Clark, W. W. MEET THE OIL HEATING COMPETITION ON THE BATTLEGROUND OF EFFICIENCY. *Butane-Propane News*, 17, 38-41 (1955) July.

A rather complete assembly of the information from various tests is presented to show why gas is more efficient for heating. In addition to the usual relative continuous firing efficiency many other factors are presented which increase the spread between the amounts of useful heat obtained by burning a unit amount of each fuel. R. T. Ellington

Heat Pumps

Ambrose, E. R. AG & E EXPERIENCE PROVES COMMERCIAL HEAT PUMPS PRACTICAL. *Refrig. Engn.* 63 29-35; 114; 116 (1955) May.

The flow diagrams of three basic heat pump

systems and the basic considerations in the selection of the component parts of heat pumps are discussed. Data on the design characteristics and annual electrical consumption of ten typical commercial installations are given.

G. G. Wilson

Heating Estimates

Hood, H. C. HOW TO SIZE GAS-FIRED HOUSE HEATING EQUIPMENT. *Butane-Propane News*, 17, 62-66 (1955) July.

The author discusses the application of the heat-loss estimating methods based on the cubic contents and the heat loss perimeter of the space to be heated.

R. T. Ellington

Refrigeration

Harnish, J. R. VARIOUS METHODS FOR USING EVAPORATIVE CONDENSERS. *Air Cond., Heatg. and Ventil.*, 52, 84-92 (1955) July.

Municipal regulations for the use of water-saving devices as part of a refrigeration system, have focused attention on the evaporative condenser. There are many ways that this type of condenser can be used in an air conditioning or refrigeration system—single, in multiple, or in combination with a shell-and-tube condenser. These systems are described and the many piping arrangements illustrated.

Author's Abstract

McEachron, K. B., Jr. NEW CONCEPT IN REFRIGERATOR DESIGN. *General Electric Rev.*, 58, 18-21 (1955) July.

The new concept is the wall refrigerator mounted in harmony with kitchen wall cabinets. The development is traced with considerations of insulation, size, location of electric refrigeration mechanism and installation.

J. F. Reed

Space Heating

Clark, W. W. DEALER'S "HEATING INSTITUTE" BRINGS RELUCTANT CONTRACTORS INTO THE FOLD. *Butane-Propane News*, 17, 35-37 (1955) July.

An advertising program for gas heating set up by the sales manager of a "Heat Contracting" firm.

J. G. Chalcraft

Johnston, D. W. (assigned to Hartzell Industries, Inc.) COMBUSTION TYPE AIR HEATER FOR DRYING PURPOSES. U.S. 2,716,975 (1955) September 6.

Pinatelli, T. HEATER APPLICABLE TO FLOOR AND WALL. U.S. 2,716,976 (1955) September 6.

Witt, G., Miller, H. W. and Miller, L. A. FUEL BURNING SPACE HEATER. U.S. 2,715,399 (1955) August 16.

Wray, G. O. and Wilson, F. E. GAS FURNACE. U.S. 2,716,974 (1955) September 6.

Water Heaters

Loyles, R. O. and Walker, J. W. HEATER FOR LIVESTOCK WATERING TANKS. U.S. 2,716,977 (1955) September 6.

Schneiter, E. J. GAS HEATERS, U.S. 2,713,331 (1955) July 19.

3. COMBUSTION AND INDUSTRIAL FURNACES

Air Pollution

Swearingen, J. S. and Levin, H. HYDROCARBON LOSSES FROM THE PETROLEUM INDUSTRY IN LOS ANGELES COUNTY. Air Pollution Foundation, 1, Report No. 5, 22 pp., Los Angeles (1954) November.

As a re-check on the total daily hydrocarbon losses in Los Angeles County estimated as 224 tons per day by the Western Oil and Gas Assoc. in March, 1954, the Southwest Research Institute as impartial auditors report their estimate of losses to be 251 tons. This is within the limits of error. Olefin losses of amylenes and heavier were audited to be 16.5 tons, compared to the 12.2 tons/day reported by WOGA. These compounds are believed to be the major contributors to smog in the Basin. Refining capacity and storage losses (95%) and oil field data (52% of production) were covered in the present survey, and the losses, and the methods of reducing them are discussed in detail. Control measures had reduced these losses from 380 tons in 1953 to the present 251, and to an estimated 146 tons for May 1955. Recent studies indicate that motor vehicle exhaust is a far greater source of hydrocarbon vapor losses, amounting to 1200 tons per day.

O. P. Brysch

Coal-Electric Locomotive

NORFOLK AND WESTERN COAL-FIRED STEAM-TURBINE-ELECTRIC LOCOMOTIVE. *Mech. Eng.*, 77, 588-95 (1955) July.

A description of this newly developed locomotive, its operation and the results of road tests following 19,000 miles of service are presented. Rated at 4500 H.P. the locomotive was designed for burning bituminous coal at a rate of 6500 lb per hour and for producing steam at 600 psi and 900° F. The steam turbine is of the noncondensing impulse type operating at 8000 rpm. Performance of the locomotive in operating tests, when compared with that of two other types of locomotives shows an equal or greater tonnage capability, a fuel savings up to 30 percent but an average speed 13 percent less. E. J. Pyrcioch

Flame Research

Berl, W. G., Rice, J. L. and Rosen, P. FLAMES IN TURBULENT STREAMS. *Jet Propulsion*, 25, 341-46 (1955) July.

Several simplified models are described as possibly accounting for the increased burning rate due to turbulence. Schlieren photographs of turbulent pentane-air flames do not show the reaction zone structure clearly, and it is not yet possible to state whether these turbulent flames are folded laminar flames, homogeneous reactions or a combination of both.

S. A. Weil

Industrial Heating

FLAME HARDENING BY OXY-TOWN GAS. *Gas J.* (British) 283, 207-09 (1955) July 20.

The author describes the operation of the Peddinghaus oxy-town gas plant for flame hardening of crankshafts. The process is an outstanding example of the merits of gas in an essential branch of industry, and the exact controllability of the system has enabled it to supersede earlier and less economical methods of applying gas to the job of flame hardening. J. G. Chalcraft

THE MALTING OF BARLEY. *Ind. Gas* (British) 18, 304-09 (1955) July.

The malting process is described along with the results of tests performed to determine the heat requirements of the process and the effect of using recirculated air to reduce heat requirements. R. T. Ellington

4. GASIFICATION AND CARBONIZATION

Carbon-Steam Reactions

Von Fredersdorff, C. G. REACTIONS OF CARBON WITH CARBON DIOXIDE AND WITH STEAM. Institute of Gas Technology Research Bulletin No. 19 (1955) May ($7.50).

Studies of high-temperature reactions between a solid fuel and oxidizing gases are presented as a) the development of mathematical procedures which may have general use in estimating chemical and physical factors associated with carbon gasification, and b) application of these procedures to steam and carbon dioxide decomposition rates and gas analyses derived from experimental data obtained with continuous flow fixed-bed reactors at atmospheric and superatmospheric pressures, and from a cyclic flow fixed-bed water-gas generator operating at atmospheric pressure. The investigation of the carbon-carbon dioxide and carbon-steam systems at atmospheric pressure was conducted with high purity coal-tar pitch coke in heat-resistant mullite tubes. Carbon dioxide decompositions correlated satisfactorily with Langmuir-type rate equations over limited ranges of inverse space velocity. For the carbon-steam system at atmospheric pressure it is shown, that a limiting temperature exists, approximately 2100° F. below which the reaction phenomenon appears to be primarily kinetic, and above which increasing diffusional effects occur. Corresponding kinetic and mass transfer rate constants are estimated by fitting assumed rate expressions to the low- and high-temperature ranges. Gas compositions vary primarily with the steam decomposition, with little indicated temperature effect. These compositions correlate satisfactorily with simple algebraic relationships based on stoichiometry and a variable expansion factor. A Langmuir-type rate equation for steam decomposition is fitted to carbon-steam system data obtained with an alloy tube reactor at superatmospheric pressures. The reaction velocity constant appears to decrease with pressure; however, since the data are rather limited, no definite conclusions can be drawn regarding the proper form of the rate equation. In an Addendum are presented approximate rate-constants and mass

transfer coefficients derived from cyclic water-gas production data from Battelle Memorial Institute. In the temperature range 1700° F. reaction rates in the cyclic system, with ¾ x 1¼ in oven coke, appear to be 4.5 to over 50 times greater than IGT values obtained with —10 to +20 mesh pitch coke. This may be due partially to a more reactive coke, errors in temperature and composition measurement, and the 8- to 40-fold higher steam flow rates employed in the water-gas generator. From the evaluated reaction constants for the cyclic system, a series of conversion curves are computed which, when combined with a heat balance, serve as a method of estimating steam decompositions per operating cycle. The mathematics for this type of stepwise calculation is presented in useful form. C. G. von Fredersdorff

Carbonization Research

Dryden, I. G., Griffith, M. and Kirby, R. A. COKE FORMATION AND COAL BLENDING. *Coke and Gas* (British), 17, 272-79 (1955) July.

If the composition and structure of coals, and the mechanism of softening and decomposition were thoroughly understood then the nature and proportions of the products of carbonization could be brought under greater control, and blending could be put on a scientific basis. With the present day problem of widening the range of coals suitable for coke making, the industry is still reliant upon practical experience and empirical laboratory methods and has no complete understanding of why coals form coke. The authors discuss the recent published work and integrate this with the accumulated knowledge on softening, decomposition, swelling mechanism, hardening, briquetting, blending, and heating rate, and show how some of these ideas have been utilized in practice.
O. P. Brysch

Coal Bin Design

Richards, J. C. GRANULAR FLOW THROUGH BUNKERS. *Brit. Coal Utilis. Research Assoc. Monthly Bull.*, 19, 145-58 (1955) April.

A review is presented of some of the problems encountered in feeding granular material from storage bunkers together with an outline of remedies and suggestions offered in the literature. The feeding of coal and coke from hoppers is given particular attention as regards segregation, degradation of size, arching and regulation of flow. E. J. Pyrcioch

Coal Gasification

Clarke, A. B. (assigned to Standard Oil Co.) CONVERSION OF A CARBONACEOUS MATERIAL-WATER SLURRY. U. S. 2,712,495 (1955) July 5.

A process is described for converting a suspension of coal in water to synthesis gas by contacting the slurry with hot fluidized heat transfer material in a generator at a temperature of 1600° F. E. J. Pyrcioch

GASIFICATION OF COAL DUST. *Coke and Gas* (British), 17, 230-1 (1955) June.

The Koppers-Totzek pulverized coal gasification plant which produces synthesis gas for ammonia production at Oulu, Finland has been considered a success to the extent that plant facilities are being doubled in capacity. This requires the installation of two additional gasifiers for a total plant production of 10 MMCF synthesis gas per day. C. G. von Fredersdorff

Coal Properties

Barthauer, G. L. IMPROVED PLASTOMETER FOR STUDYING AGGLUTINATING BEHAVIOR OF CAKING COAL. *Anal. Chem.*, 27, 969-71 (1955) June.

A rotating paddle type plastometer is described which is useful for determining the relative torques developed by various coals during heating through the carbonization period. A continuous spring-load torque recording device, incorporated in the paddle drive-shaft, uses the movement of a slide-wire contact to vary the voltage to a potentiometer. The coal sample is diluted with known proportions of inerts (char or sand) to permit tests over a broad range of caking strength. Heating rates up to 30° C. per minute are used to permit correlation of resistance with behavior in large continuous, fluidized bed operations. O. P. Brysch

Groenewege, M. P., Schuyer, J. and Van Krevelen, D. W. CHEMICAL STRUCTURE AND PROPERTIES OF COAL X—DIELECTRIC

CONSTANTS OF LOW RANK AND BITUMINOUS COALS. *Fuel* (British) 34, 339-44 (1955) July.

Using immersion liquids having dielectric constants close to that of coal, the dielectric constants were determined on low-ash vitrinites of various ranks from 70 to 92 percent carbon. The calculated molar dielectric constant was found to decrease with increasing C content to a point of 87% C, after which it rose rapidly, due to pronounced increase in electrical conductivity. This is consistent with the earlier reported decrease in molar refractometric increment in the same region. O. P. Brysch

Schuyer, J. and Van Krevelen, D. W. CHEMICAL STRUCTURE AND PROPERTIES OF COAL XI—THERMAL EXPANSION COEFFICIENT. *Fuel* (British), 34, 345-50 (1955) July.

Eight vitrinites of coals No. 4 to 11 of the coalification series were measured for thermal expansion in directions parallel and perpendicular to the bedding plane. The anisotropy of the expansion coefficient reaches a maximum at 94% C, then decreases slightly and rises again, in similarity to earlier reported elastic constants. O. P. Brysch

Hydrocarbon Gasification

Milbourne, C. G., and Spengler, W. E. (assigned to Surface Combustion Corp.) PROCESS AND APPARATUS FOR MAKING FUEL GAS. U. S. 2,711,419 (1955) June 21.

A process for the production of 500-600 Btu/SCF 0.35-0.70 specific gravity gas from sulfur-bearing petroleum naphtha is disclosed. This process, based on work done at the Surface Combustion Corporation, Toledo plant, consists of catalytic reforming of the vaporized naphtha or naphtha of overhead from a distillation tower, with steam over nickel catalyst, followed by removal of hydrogen sulfide from the hydrogen-carbon monoxide-carbon dioxide mixture thus formed and by passage of this purified gas at 500-900° F. over a second bed of nickel catalyst to convert a portion of the hydrogen and carbon monoxide to methane. H. R. Linden

Hydrogenation-Coking

Bluemner, E. CHEMICAL MODIFICATION OF COAL INTO HYDROCARBON OILS AND COKE. U. S. 2,714,086 (1955) July 26.

High yields of low boiling liquid hydrocarbons are claimed for a continuous process in which finely-ground bituminous coal mixed with oil is subjected to stagewise heating under 20 kg per sq cm while flowing through six successive treating sections. Ranges of 290 to 310° C. and approximately 450° (cracking) are maintained to give self-hydrogenation and dissolving action on the coal, after which the final stage liquid is discharged, with pressure release, into a batch-wise coking retort and the volatilized components therefrom are condensed. O. P. Brysch

India Fuel Problems

PROBLEMS OF ENERGY DEVELOPMENT IN INDIA—II (OUR REQUIREMENTS). *Fuel Research Inst. News* (India), 4, 2-6 (1954) December.

The sources of present-day energy production in India and the projected fuel demand to meet the planned industrialization are discussed. It is estimated that 72 million and 100 million tons of coal, as against the 35 million tons now consumed, will be needed by 1965 and 1975 respectively in the event that the proposed national planning for industrialization is accomplished. K. C. Channabasappa

Lurgi Pipe Line Gas

Fletcher, H. B. MAKING VICTORIA INDEPENDENT VIA 102-MILE LONG MANUFACTURED GAS LINE. *Gas Age*, 116, 36-8, 58 (1955) July 28.

A report on an Australian project involving production of manufactured gas from brown coal in a Lurgi gas making plant at a site 100 miles from the ultimate consumption. An 18 inch diameter—450 psi line is being built for a design capacity of 80 to 90 MMCC/day. R. F. Bukacek

Oil and Coal Tar Pitches

Charette, L. P. and Bischofsberger, G. T. BINDERS FOR CARBON ELECTRODES IN THE ALUMINUM INDUSTRY. *Ind. Eng. Chem.*, 47, 1412-15 (1955) July.

Methods for characterization of petroleum, oil gas and coal tar pitches for use as binder ma-

terials in carbon electrodes for the aluminum industry are presented. The compressive strength of test electrodes is shown to be directly related to the coking value multiplied by the carbon-hydrogen weight ratio of the whole pitch or to the product of the carbon-hydrogen weight ratios of te benzene-insoluble and benzene-soluble fractions of the pitch multiplied by the percentage of benzene-insoluble constituents in the pitch. On the basis of these characterization factors, oil gas tars with the suitable combination of critical properties are shown to be equivalent to coal tar pitches.

H. R. Linden

Reformed Gas

Frink, J. HASCHE GAS REFORMERS IN FLORIDA. Amer. Gas Assoc. Oper. Sect. CEP-55-11. *Amer. Gas J.*, 182, 19 (1955) July.

The operating results for the eight Hasche gas reformers installed in Florida are reviewed.

H. R. Linden

McGurl, G. V. and Fleming, G. L. THE KOPPERS-HASCHE REFORMER. *Gas*, 31, 59-61 (1955) June.

This reformer consists essentially of two highly efficient regenerators, separated by a combustion chamber. These regenerators are packed with special patented tile, made from high-grade alumina. When these tiles are laid face to face, they form regenerative masses with channels in the tile matching to form a number of small parallel flues that extend throughout the length of the regenerative masses. All the refractories are enclosed in a steel shell, the temperature of which, at the hottest point, does not exceed 200° F under normal operation. One or two injectors inspirates a small amount of primary air with the hydrocarbons to be reformed, and a four-way reversing valve controls the direction of flow of gases through the furnace. Authors' Abstract

MAKE CATALYSTS TO ORDER . . . IT'S GOOD BUSINESS. *Chem. Eng.*, 62, 112-14, 116, 118 (1955) July.

The Girdler Division of National Cylinder Gas announces a $1,000,000 catalyst manufacturing plant expansion and a new shape of G-29 Nickel-base reforming catalyst (¾-inch hollow cylinders) which is claimed to increase yields up to 25%. H. R. Linden

5. NATURAL GAS AND NATURAL GAS CONDENSATES

Adsorption Storage

Spangler, C. V. (assigned to J. F. Pritchard and Co.) METHOD OF AND APPARATUS FOR STORING GASES. U. S. 2,712,730 (1955) July 12.

A method of storing gases on a solid adsorbent and the apparatus used for storing or the releasing of gases in the adsorbent as desired are described. A few examples are given on the results of adsorption of methane, methane-nitrogen and the adsorbents used in this system.

J. R. Hasenberg

Etherington, L. D. (assigned to Esso Research and Engineering Co.) ADSORPTION PROCESS. U. S. 2,710,668 (1955) June 14.

The invention is concerned with the control of temperature in a process for the continuous adsorption on solid adsorbent of components of a gaseous mixture. R. F. Bukacek

Carbon Black

Sweitzer, C. W. METHOD OF TREATING FURNACE CARBON BLACK. U. S. 2,707,672; —and Melore, P. J. METHOD OF TREATING FURNACE CARBON BLACK. U. S. 2,707,673; PROCESS FOR ACTIVATING FURNACE BLACKS. U. S. 2,707,674, (assigned to Columbian Carbon Co.) (1955) May 3.

These patents describe a process of treating furnace carbon blacks by heating in a shallow bed to a point just below their ignition temperature and exposure at this temperature to air or air-stream mixtures. It is claimed that a significant improvement in color and pH is achieved by the resulting addition of oxygen, and no significant weight loss of the black is experienced. Further treatment of the black to higher temperatures, and removal of the oxygen volatiles is said to improve the iodine adsorption values significantly.

D. V. Kniebes

Compression

Baird, R. C. NOISE-CONTROLLED COMPRESSOR STATION WITHIN A RESIDENTIAL AREA. *Pipe Line Ind.*, 3, 20-25 (1955) July.

A discussion of compressor station noise; cause,

characteristics and abatement as being applied by Southern California Gas Company in a Los Angeles residential area. R. F. Bukacek

Drilling

Talbot, J. E. CLEANABLE CORE BARREL. U. S. 2,713,473 (1955) July 19.

This invention relates to the improvements of core barrels. The circulation of a fluid down a drill string through a hollow stem attached to the core barrel for flushing purposes and the means of connection are described.

J. R. Hasenberg

Bodine, A. G., Jr. SONIC EARTH BORING DRILL WITH SELF RESONATING VIBRATION GENERATION. U. S. 2,713,472 (1955) July 19.

A bit for applying vibratory drilling action by use of an elastic vibration generator with housing are described. J. R. Hasenberg

Line Anchoring

Vander Heyden, H. C. and Wallace, E. A. HOLD THAT PIPELINE. *Oil Gas J.*, 54, 109-115 (1955) July 11.

A description of experience with the movement of large-diameter pipe lines due to temperature effects and the method of anchoring used to combat it. R. F. Bukacek

LP-Gas

WHAT IT COSTS TO CONSTRUCT AN LP-GAS BULK PLANT. *Nat. Petroleum News*, 47, 130-31 (1955) July.

A rough break-down of approximate cost of an LP-gas bulk plant are presented. The cost runs between $17,800-$20,400 for the plant itself; not included in these costs are delivery trucks, cylinders for accounts, and the land of the plant site. H. A. Dirksen

Main-Size Economics

Mundth, L. K. and Buell, E. H. WHAT SIZE MAIN NOW? *Gas Age*, 115, 33-37, 62 (1955) June 2.

An economic analysis of main sizing based on present worth of future annual fixed charges.

R. F. Bukacek

Network Design

Klohn, C. H. GAS-PIPELINE-NETWORK FLOW CALCULATIONS. *Oil Gas J.*, 54, 178-80, 182, 183, 188, 190-92 (1955) July 25.

A discussion of the application of the Hardy Cross method of network analysis as applied to the design of compressor station yard piping in the T.G.T. system. R. F. Bukacek

Peters, W. C. LOAD DATA MECHANICS. *Gas*, 31, 43-49 (1955) June.

A method of applying gas load data to system design is illustrated, including the use of visual aids and mathematical procedures.

R. F. Bukacek

Pipe Line Cleaning

McClure, C. SOAP AND WATER CLEAN DIRTY PIPELINES TOO. *Oil Gas J.*, 54, 107, 110, 112, 116 (1955) July 4.

A description of El Paso Natural's equipment and procedures for detergent cleaning of pipelines. R. F. Bukacek

Pipe Line Construction

Taylor, D. M. LAYING 36-INCH PIPE JUST LIKE 30-INCH. *Pipe Line Ind.*, 2, 39-43 (1955) June.

A brief description with photographs of the equipment and procedures being used by several contractors in laying 36-in. pipe.

R. F. Bukacek

Wallace, E. A. and Vander Heyden, H. C. HOW TO SOLVE EXPANSION PROBLEMS IN HIGH PRESSURE LINES. *Gas*, 31, 111-119 (1955) June.

The effects of expansion of pipelines due to pressure and temperature, and the methods for controlling the effects of expansion developed by Southern Counties Gas Company and Stone and Webster are discussed.

R. F. Bukacek

Wilder, A. B. WHEN STRONGER LINE PIPE IS NEEDED PIPELINERS WILL GET IT. *Oil Gas J.*, 54, 130, 133 (1955) May 9.

Two new developments in the manufacture of line pipe, cold expanded seamless pipe, and T-1 line pipe steel are discussed.

G. G. Wilson

Piping Code

Hough, F. A. CORROSIVITY OF GASES AND SOILS AND THE PREVENTION OF OVER-PRESSURING. *Gas*, 31, 129-130 (1955) June.

This article continues the discussion of Section 8 of ASA B31.1 Gas Transmission and Distribution Piping Code appearing as a series of articles in *Gas* magazine. R. F. Bukacek

Reservoir Seal

LP-GAS CAVERN STORAGE AT LOW COST. *Gas Age*, 115, 40-42 (1955) May 5.

A newly developed sealant for sandstone, composed of a water emulsion of neoprene and a silicone resin, has provided a new impetus to cavern type storage. Complete facilities can be built for $5 per barrel, with the possibility of this figure being even lower. (See also *Gas Abs*, 11, 146) B. E. Eakin

Prospecting

Agnich, F. J. GEOPHYSICAL INSTRUMENTATION IS MAKING RAPID PROGRESS. *World Oil*, 140, 109-11, 114 (1955) April.

Significant advances have been made recently in the field of geophysical techniques. These include magnetic recording, mechanical plotting of seismograms, inducing seismograph shocks by weight dropping, marine shooting require a single ship, and an increase in the range of frequencies used for seismic recordings. These new techniques are discussed briefly.

B. E. Eakin

Oliphant, C. H. and Fullerton, P. HOW COMPUTERS FACILITATE STRATIGRAPHIC CORRELATIONS. *World Oil*, 140, 132, 134, 136, 138 (1955) April.

A new method of plotting information obtained from seismogram calculations has proved helpful in locating stratigraphic traps that existing methods overlook or do not define clearly. The new method utilizes punch-card calculations or specially-designed computers. The results to date have proved quite successful.

B. E. Eakin

Smith, D. T. GEOPHYSICAL METHODS OF OIL PROSPECTING—A REVIEW. IV.—SEISMIC METHODS. *Petroleum* (British), 18, 211-217 (1955) June.

An excellent review of seismic methods including the theory and principles of operation.

R. F. Bukacek

Storage Control

Glamser, J. H. REMOTE CONTROL OF UNDERGROUND GAS. *Gas Age*, 115, 43; 65-66 (1955) May 5.

The Osage storage reservoir of the Oklahoma Natural Gas Company is adjacent to Tulsa, an area of high demand. . Stored gas feeds directly into the medium-pressure belt system of the Tulsa distribution network, and the flow is remotely controlled by the dispatcher. The system utilized is outlined. B. E. Eakin

Telemetering

Peckham, J. W. PIPELINE TELEMETERING. *Instruments and Autom.*, 28, 1125-29 (1955) July.

A discussion of telemtering systems; system types, transmitters, equipment and applications.

R. F. Bukacek

Well Completion

Arps, J. J. HOW WELL COMPLETION DAMAGE CAN BE DETERMINED GRAPHICALLY. *World Oil*, 140, 225-28, 230, 232 (1955) April.

Use of this graphic method will help in determining whether a well has been damaged by completion operations. The basic data for this new technique are obtained from analysis of bottom-hole pressure build-up curves. This method is a simplification of the Hurst- van Everdingen skin effect phenomenon relationships. The theory, use, and several examples are presented. B. E. Eakin

Well Corrosion

De Witte, L. CURRENT REQUIREMENTS FOR CATHODIC PROTECTION OF WELL CASING. *Oil Gas J.*, 54, 109-16 (1955) May 9.

The interpretation of open hole and inside casing spontaneous potential surveys in predicting and treating external casing corrosion is considered and a method of predicting cathodic protection current requirements is described.

G. G. Wilson

Wiggins, J. L. CORROSION CONTROL IN TEXAS GAS FIELDS. *Petroleum Eng.*, 27, B96, 98-102 (1955) June.

After a brief outline of the general methods used to prevent and check on the extent of corrosion of the gathering lines in a gas field, the use of inhibitors to prevent internal corrosion of gas well piping is described. Various methods of injecting liquid and solid inhibitors are illustrated. G. G. Wilson

Well Logging

De Witte, L. A STUDY OF ELECTRIC LOG INTERPRETATION METHODS IN SHALY FORMATIONS. T.P. 4076 *J. Petroleum Techn.*, 7, 103-10 (1955) July.

A review is given of the principles on which recently proposed methods of electric log interpretation in shaly sand are based, and of the evidence brought up in support of the theoretical derivations. Based on the concept of reduced ionic activity of the double layer counter ions near the negatively-charged rock surfaces in shaly sands, a new set of electrochemical relations has been derived. Experimental evidence is given in support of the new equations.
B. E. Eakin

Kunz, K. S., and Tixier, M. M. TEMPERATURE SURVEYS IN GAS PRODUCING WELLS. T.P. 4077. *J. Petroleum Techn.*, 7, 111-19 (1955) July.

A method for interpreting temperature curves recorded in gas producing wells is described. The method includes a graphical construction which represents the amount of gas flowing from a given producing formation. When this technique is applied in conjunction with induction and radio-activity logs, the point of entry and the estimated over-all thickness of the pay zones, with the relative production from each zone, can be determined. The effect of fracturing can be evaluated by this method. The application of this technique has emphasized the importance of sand-shale interfaces in gas production. Field examples are given, illustrating the calculations. B. E. Eakin

6. PETROLEUM AND SYNTHETIC LIQUID FUELS

Flooding Practise

Vivian, C. H. SWAPPING WATER FOR OIL. *Compressed Air*, 60, 192-199 (1955) July.

Secondary recovery now underway at North Burbank Field, Oklahoma, is discussed. The source of water and the equipment used in the water-flooding of petroleum in a reservoir is fully covered. The history of the project, the leasing area and the amount of crude oil expected to be recovered are discussed.
J. R. Hasenberg

Fluid Coking

Thornton, D. P., Jr. WHY CARTER LIKES ITS COKER. *Petroleum Processing*, 10, 840-45 (1955) June.

The first commercial fluid coker has been successfully placed on stream. The Carter Oil Co. also uses this process to work over pitch stocks and reduced crude. The fluid coker has been proved operable over a wide range of feeds and process conditions and is very insensitive to process upsets and power outages.
W. G. Bair

German Oil Production

Stahmer, A. M. GERMANY'S GOAL: 25 MILLION BARRELS OF OIL IN 1959. *World Oil*, 140, 302-04, 312 (1955) June.

The German Producers Association has forecast a goal for 1959 which appears to be supported by estimates of the proven and probable reserves of 464 million barrels at the end of 1954. The rise in proven reserves in 1954 was a phenomenal 19%, despite the 1954 production. Deeper drilling are credited for many of the new discoveries. B. E. Eakin

Oil Sand Treatment

WILL WE MINE OIL? *Chem. Eng.*, 62, 130, 132 (1955) June.

A novel separation process now going into large-scale testing, at Bitumount, Alberta may unlock the 700 billion barrels of oil estimated to be contained in the major oil sand deposits of the world. The process involves taking the sands from the strip mine, diluting with light oil to make it flow, and whirling in a centrifugal separator in the presence of water and an un-

disclosed chemical. The oil, sands and clays separate by differences in densities. Ninety-eight percent recovery in the pilot unit in Alberta is claimed. Cost estimates are placed at about $1.00 per bbl, or 35 percent of previous oil sand processes. E. B. Shultz

Recent Fields

Stead, F. L. DRICKEY-CAPROCK QUEEN SAND TREND. *World Oil*, 140, 156, 158-60, 163-64 (1955) June.

This sand in southeastern New Mexico has developed into the biggest shallow oil play in many years. As of Jan. 1, 1955, a total of 130 wells were producing, and 4¼ million barrels of oil had been recovered. The geology of the area is discussed, along with the physical behavior of the reservoir fluid. Future developments will probably double the area of the field. B. E. Eakin

7. ANALYTICAL METHODS AND TESTS

Gas Analyzer

Miller, E. C. (assigned to Phillips Petroleum Co.) INFRARED GAS ANALYZER. U. S. 2,703,844 (1955) March 8.

An infrared gas analyser is described which contains multiple reflection cells to increase the absorption path length of the sample thereby increasing sensitivity for low concentrations of compounds in gas mixtures. The instrument is of the non dispersive type and with continuous record the concentration of the component being determined. D. V. Kniebes

Hydrocarbon Spectrometry

Clerc, R. J., Hood, A., and O'Neal, M. J., Jr. MASS SPECTROMETRIC ANALYSIS OF HIGH MOLECULAR WEIGHT, SATURATED HYDROCARBONS. *Anal. Chem.*, 27, 868-75 (1955) June.

A mass spectrometric method has been developed for the hydrocarbon type analysis of high boiling, predominantly saturated petroleum fractions. The following hydrocarbon types are determined: alkenes (iso-plus normal), noncondensed cycloalkanes (mono-plus polyring compounds in which no rings are in a condensed structure), condensed cycloalkanes (two or more rings in condensed configuration(monoaromatics, and naphthalene derivatives. In addition, the relative abundance of cyclopentyl and cyclohexyl rings as free structures is estimated. The method is based on the mass spectra of over 60 pure hydrocarbons and several narrow hydrocarbon-type concentrates. Average spectra of all compounds of each of the several hydrocarbon types were used to formulate the calculation matrix. Use of the method to analyze each of these pure compounds shows that structural variations within each hydrocarbon type generally do not greatly affect the determination of that type. On the average, pure compounds of a single hydrocarbon type are analyzed with an accuracy of about 95% (theoretical = 100%). The consistency of the method for different hydrocarbon mixtures has been determined by application to synthetic blends and to the analysis of separated petroleum fractions. Authors' Abstract

Toxic Gases

Schrenk, H. H. TOXICITY STUDIES PARALLEL INDUSTRIAL INTEREST IN ISOCYANATES. OZONE AND OXIDES OF NITROGEN CONTINUE TO RECEIVE ATTENTION. *Ind. Eng. Chem.*, 47, 107A, 108 (1955) June.

Recent papers on toxicity of isocyanates, ozone, and oxides of nitrogen are discussed.

D. M. Mason

8. GENERAL AND PHYSICAL CHEMISTRY

Computers

Arnoff, E. L. THE APPLICATION OF LINEAR PROGRAMMING TO PRODUCTION ENGINEERING AND SCHEDULING. Amer. Soc. Mech. Eng. Paper No. 54—A-223 (1954) November.

A general discussion of the application of linear programming to production engineering and production scheduling. An illustrative problem is given. S. Hu

Breen, J. M. PROBLEMS INVOLVED IN THE APPLICATION OF ELECTRONIC DIGITAL COMPUTERS TO BUSINESS OPERATIONS. *Computers and Automation*, 4, 16-21, 34 (1955) March.

The paper discusses rather thoroughly the costs, maintenance, and operation of electronic digital computers as applied to business operations. Importance of economy and efficiency is stressed. S. Hu

Hovious, R. L., Morrill, C. D., and Tomlinson, N. P. INDUSTRIAL USES OF ANALOG COMPUTERS. *Instr. and Autom.*, 28, 594-601 (1955) April.

There are two different approaches to analog computing: 1) the mathematical approach wherein equations are solved in a straightforward manner, and 2) the method of simulation, which only requires transfer-function-type (empirical) equations of the equipment or process under study. The latter approach renders many complicated non-linear systems solvable. In the analog simulation of a system, the four basic operations (multiplication, addition, integration, and differentiation) are usually performed by the direct-coupled amplifier, with or without adding various feed-back elements. These basic circuits are discussed and two examples given to illustrate the large number of applications of the computer. Various problems involved in the use of analog computers for design, development and process control purposes are also analyzed. S. Hu

Hunter, G. T. and Clark, G. M. ELECTRONIC DATA-PROCESSING MACHINES. *Instrum. and Autom.*, 28, 782-93 (1955) May.

A rather complete but brief description of the functions and applications of the electronic data-processing machines manufactured by IBM. S. Hu

Strong, J. D. A PRACTICAL APPROACH TO ANALOG COMPUTERS. *Instr. and Autom.*, 28, 602-10 (1955) April.

The paper explains the basic components of analog computers (attenuaters, amplifiers, patch panel, etc.), the method for set-up and use of the computer, and the various techniques for solutions of problems. S. Hu

Hydrocarbon-Water Solubility

Leland, T. W., Jr., McKetta, J. J., Jr., and Kobe, K. A. PHASE EQUILIBRIUM IN 1-BUTENE-WATER SYSTEM AND CORRELATION OF HYDROCARBON-WATER SOLUBILITY DATA. *Ind. Eng. Chem.*, 47, 1265-71 (1955) June.

The mutual solubilities of 1-butene and water were determined in the region of two liquid phases from 100° F. to 310° F. and from 1000 to 10000 psi. An empirical correlation method is presented. R. F. Bukacek

Thermal Conductivity

Callear, A. B., and Robb, J. C. AN EXPERIMENTAL METHOD OF MEASURING THE THERMAL CONDUCTIVITY OF GASES. *Faraday Soc. Trans.* (British), 51, 630-38 (1955) May.

A method is described whereby the thermal conductivities of gases may be measured down to low pressures without interference from the temperature discontinuity at the gas-solid interface which normally precludes such measurements. The thermal conductivities of simple gases are shown to be quite constant down to these low pressures, but abnormal behavior is found with complicated molecules.

Authors' Abstract

Kowalczyk, L. S. THERMAL CONDUCTIVITY AND ITS VARIABILITY WITH TEMPERATURE AND PRESSURE. Amer. Soc. Mech. Eng. Paper No. 54 A-90 (1954) November 28.

The present status of the theory of thermal conductivity and its variability with temperature and pressure is given on the basis of the nature of heat, structure of matter and resistance to heat flow in the various states of matter.

R. T. Ellington

9. ORGANIC CHEMISTRY

Acetylene

Batholomé, E. THE BASF PROCESS FOR PRODUCTION OF ACETYLENE BY PARTIAL OXIDATION OF GASEOUS HYDROCARBONS. *Chem. Eng. Sci.* 3. Special Suppl. Conference on Oxidation Processes, Amsterdam, (1954) May 6-8.

This is a comprehensive presentation of the BASF partial combustion process for acetylene production as carried out in Germany. The author clearly describes the process, equipment and technical problems together with their solution. Comparison with other acetylene processes is also made. J. M. Reid

Sittig, M. ACETYLENE—A CHALLENGE TO THE PETROCHEMICAL INDUSTRY. *Petroleum Processg.*, 10, 1011-1023 (1955) July.

A comprehensive review article on acetylene

production and utilization for petro-chemical purposes which outlines the future trends for acetylene production from natural gas and other hydrocarbons. H. R. Linden

Petrochemicals

Jackson, W. K. and Krausse, D. M. IT'S AN EASY ROAD FROM CONVENTIONAL FUELS TO PETROCHEMICALS. *Petroleum Proc.*, 10, 872-875 (1055) June.

The experiences of a small refiner upon entering the petrochemical field are discussed in this article. Products and processes selected and methods of developing new ventures are presented, with producing and marketing agreements made in cooperation with established chemical companies particularly emphasized. It is the opinion of this company that the petrochemical field can be quite profitable to the small refiner. J. M. Reid

10. CHEMICAL ENGINEERING

Absorber Design

Parekh, R. H. ABSORPTION AND STRIPPING DESIGN. Part I BASIS FOR DESIGN METHOD; Part II EXAMPLE CALCULATION FOR ABSORPTION SYSTEM; Part III EXAMPLE CALCULATION FOR STRIPPING SYSTEM. *Petrol. Refiner* 34, 123-26 (1955); 129-36; 123-27 June; July; August.

The first part of this three-installment article outlines the problems involved in choosing a method of absorption and stripping column design calculations. The advantages of each method are mentioned as well as their liabilities. The author then presents his own method of obtaining these calculations by graphical methods with sufficient accuracy for engineering purposes. Part II deals with the application of the process design methods of absorption and stripping unit calculations and is illustrated by a simplified problem of an absorption plant. The flow diagram for the unit and the calculation sheets are given. The calculations for each of the various units are discussed in detail. The final part gives an example of the application of this method to the calculation for a stripping system. The procedure for rectifying section design calculations is also included. An equilibrium K value nomograph for hydrocarbons up to n-heptane is presented for pressures up to 4500 psia and temperatures from 40 to 800° F. B. E. Eakin

Cooling Towers

Agnon, S. E., and Spurlock, B. H., Jr. PSYCHROMETRIC ANALYSIS FOR DESIGN OF FORCED DRAFT AIR COOLING TOWERS. *Heating, Piping and Air Cond.*, 27, 137-44 (1955) July.

A method of design is developed that provides a quick method of closely estimating the relevant data for towers under a wide variety of conditions. The method is graphical but subject to smaller errors than normally incurred in taking measurements in actual units.

R. T. Ellington

Cost Data

Weaver, J. B. MORE HELP IN FINDING COST DATA. *Chem. Eng.*, 62, 247-52 (1955) June.

A subject index is given to aid in finding recent cost data. Individual subjects are cross-listed with 186 pertinent literature articles containing cost information which appeared in the journals during 1954. J. M. Reid

Dust Precipitator

Armstrong, J. A., and White, H. J. (assigned to Research Corporation, New York) HIGH EFFICIENCY HIGH VELOCITY ELECTROSTATIC AIR CLEANER. U. S. 2,711,225 (1955) June 21.

The invention describes an electrostatic precipitator which has been designed for smooth gas flow conditions at high gas velocities. Turbulence and eddying which result in lowered collecting efficiencies are reduced through the use of streamlined internal members.

E. J. Pyrcioch

Davis, A. S., Jr. (assigned to Research Corp., New York) ELECTRIFIED CENTRIFUGAL GAS CLEANING DEVICE. U. S. 2,711,226 (1955) June 21.

This apparatus for removing dust from gases consists of a gas treating chamber with two concentric cylinders and provision for subjecting the gas to centrifugal motion and to an electric field for agglomerating the smaller particles. E. J. Pyrcioch

Flow Energy

Hutchinson, F. W. 16 EXAMPLES AND SOLUTIONS TO ENERGY EQUATIONS FOR FLOW AND NONFLOW SYSTEMS. *Air Cond., Heating and Ventilating*, 52, 98-99 (1955) June.

A review of the energy equations for practical systems involving non-flow, flow, and flow to non-flow systems. R. F. Bukacek

Fractionation

HERE'S HOW UNIFLUX TRAYS ARE PERFORMING. *Oil Gas J.*, 54, 100-03 (1955) June 20.

A description of Socony Uniflux fractionating trays, their construction and performance in several services. R. F. Bukacek

Gas Drying

Beggs, D. (assigned to Surface Combustion Corp.) GAS GENERATOR AND PROCESS FOR PRODUCING DRY GAS. U. S. 2,712,981 (1955) July 12.

The drying of inert gases for protective atmospheres in the annealing of steel and other such purposes is described. Continuous treatment is effected by carbon dioxide removal with monoethanolamine and moisture removal by refrigeration followed by activated alumina absorption. J. R. Hasenberg

Kinetics Interpretation

Corrigan, T. E. CHEMICAL ENGINEERING FUNDAMENTALS—INTERPRETATION OF KINETIC DATA-IV. *Chem. Eng.*, 62, 227-30 (1955) July.

Solutions of sample kinetics problems are given to illustrate the method of choosing a reaction mechanism, the development of the corresponding rate equations and the evaluation of the unknown rate constants.

C. G. von Fredersdorff

Solids Handling

Berg, C. DESIGN OF PROCESS SYSTEMS UTILIZING MOVING BEDS. *Chem. Eng. Progress*, 51, 326-34 (1955) July.

The basis operation in process systems handling moving beds of granular solids are reviewed. Design considerations are given for catalytic-cracking units employing moving solids bed, for moving beds of activated carbon for gas separation, for moving coke beds in thermal coking of petroleum and for shale retorting. A wide variety of solids conveying, solids-flow control and solids-level controls equipment is discussed. E. J. Pyrcioch

11. PROCESS EQUIPMENT AND INSTRUMENTATION

Automatic Recorder

Stern, R. K. AUTOMATIC INTELLIGENCE GATHERING SYSTEMS. *Can. Chem. Processing*, 39, 55-57, 60, 62 (1955) July.

Magnitudes of temperature, pressure, flow, weight, level, stress, or any function which may be transformed into a shaft position by means such as a self-balancing potentiometer, can all be automatically recorded and tabulated in digital form at present intervals by the Automatic Logger described here. Conventional pneumatic or electrical primaries are taken as inputs and converted directly into digital form by a built-in "Digi-Coder" analog-to digital converter without further manual treatment. The results may be either printed out from an electrical typewriter or punched on a tape. The unit is said to be inexpensive and simple in maintenance, thus facilitating fast and reliable data processing at very low cost.

S. Hu

Gas Meter

Grote, P. (assigned to Aerzener Maschinen Fabrik G.m.b.H., Germany) ROTARY IMPELLER GAS METERS. U.S. 2,710,540 (1955) June 14.

An improvement of impeller-type gas meters is claimed which comprises a continuous flow of lubricating oil over the impeller bearing to wash therefrom any corrosive condensates from the gas. O. P. Brysch

Pressure Safety

Samans, W. PRESSURE RELIEF DEVICES. *Petroleum Processing*, 10, 849-53 (1955) June.

A discussion of safety and relief devices for industrial processing plant operations.

R. F. Bukacek

Process Heaters

Olley, R. DIRECT-FIRED HEATERS IN CHEMICAL ENGINEERING. *Petroleum* (British) 18, 246-50 (1955) July.

The author discusses various types of direct fired heaters suitable for heating petroleum oils and other fluids. Advantages of the different types of direct fired heaters over other types of heating and classification with reference to their duty and application are considered. Several suggestions are made regarding the design and methods of applying direct fired heating equipment for chemical and petroleum use.

J. M. Reid

Pumps

Cametti, B. and Mei, A. J. HERMETIC MOTOR PUMPS FOR SEALED SYSTEMS. *Mech. Eng.*, 77, 488-94 (1955) June.

The development of "canned motor" pumps for water circulation was accelerated by the need for leak-proof circulation for nuclear steam plants. Units of 4000 gpm operating at 2000 psig have been developed using standard commercial materials and manufacturing methods.

W. G. Bair

12. MATERIALS OF CONSTRUCTION

Cathodic Protection

Glass, D. C. WHEN DOES CATHODIC PROTECTION PAY OUT? *Pipe Line Ind.*, 2, 37-38 (1955) June; *Pipe Line News*, 27, 45-55 (1955) June.

This article is an abstract of a paper "An Economic Survey of Underground Corrosion Preventative Measures" presented at the API Sixth Annual Spring Products Pipe Line Conference, May 16, 1955. R. F. Bukacek

Coatings

Cole, H. G. TESTS ON THE RELATIVE EFFICIENCY OF CHROMATE PIGMENTS IN ANTI-CORROSIVE PRIMERS. *J. Appl. Chem.* (British) 5, 197-208 (1955) May.

The effectiveness of seventeen chromate pigments in preventing corrosion were compared by incorporating them in turn in a single paint medium. The resulting paint was applied to speciments of two different magnesium alloys, on aluminum alloy, and steel; these specimens were exposed to an intermittent sea water spray test and the amount of corrosion which occured was determined and statistically evaluated. G. G. Wilson

Freeman, R. S. and Weyermuller, G. TWO YEARS SERVICE IN CAUSTIC AND ACID AREA. *Chem. Processing*, 18, 51, 53-5, 57 (1955) July.

The successful use of a coating system using a vinyl top coat on equipment subject to 50% caustic and methyl alcohol at temperatures up to 300° F. and to 85-93% sulfuric acid is described. G. G. Wilson

Glass, D. C. HERE'S WHAT AN A.P.I. SURVEY REVEALED ABOUT COATING PRACTICES AND PROTECTION COSTS. *Oil Gas J.* 54, 133-35 (1955) June 20.

A summary of the results of a survey of coating practices and cost of corrosion prevention of 28 pipeline companies conducted by the Committee on Pipe Line Technology of A.P.I. The cost information includes the average rectifier power and magnesium anode costs in dollars per year per mile of pipe for the protection of bare and coated pipe for each company.

G. G. Wilson

Resen, F. L. HERE'S HOW TRANSCO INTERNALLY COATS 36-in. PIPE. *Oil Gas J.* 54, 111; 112; 114-15. (1955) June 20.

The method used to internally coat 36-in natural gas line pipe with an epoxy resin base material for Transcontinental Gas Pipeline Company is described and illustrated. The structure of the epoxy resin and the properties of the coating film are briefly considered and the results of two flow tests of coated water lines are presented. [See also *Pipe Line News*, 27, 42-4 (1955) June]. G. G. Wilson

Corrosion

Kear, R. W. THE EFFECT OF HYDROCHLORIC ACID ON THE CORROSIVE NATURE OF COMBUSTION. *Appl. Chem.* (British), 5, 237-42 (1955) May.

A study of the effect of hydrochloric acid on the corrosion of mild-steel by flue gases containing sulfur oxides at temperatures from 27° to 150° C. The influence of the HCl was found to be considerable. G. G. Wilson

Sherwood, P. W. OIL REFINERIES AND CORROSION BY WATER. *Petroleum* (British) 18, 50-53 (1955) February.

A survey is given of the variables involved and of methods of preventing corrosion of oil refinery equipment by water. The primary variables determining the degree of corrosiveness of water are considered to be impurities, temperature, and water velocity. The six major preventative methods,—cathodic protection, metallic coatings, organic coatings, inhibitors, environment alteration and metallurgical selection—are briefly described.

G. G. Wilson

BOLT MATERIALS FOR UNDERGOUND USE. *Gas Age*, 115, 38-39 (1955) June 2.

A summary of work done at the National Bureau of Standards on the corrosion of bolts in corrosive soils. R. F. Bukacek

Hydrogen Blistering

Neumaier, B. W. and Schilmoller, C. M. HOW RICHFIELD TACKLED HYDROGEN BLISTERING. *Oil Gas J.*, 54, 107-10 (1955) May 23.

A preliminary evaluation of the effectiveness of hydrogen sulfide removal and water washing of the feed streams in mitigating low-temperature hydrogen blistering in a fluid cat cracking unit of the Richfield Oil Corporation.

G. G. Wilson

Pitch Handling

Wallace, B. P. (assigned to Whitehead Brothers Co.) COATED NON-IRRITATING COAL TAR PITCH. U. S. 2,714,077 (1955) July 26.

Protection of workers from dermatitis in the industries handling coal tar pitch is achieved by coating the ground pitch particles by spraying with an emulsion of a soft, neutral, pitch-insoluble wax in proportions of 0.25 to 2.0% by weight. O. P. Brysch

Plastic Pipe

Boggs, H. D. and Longenecker, D. R. TECHNIQUES DEVELOPED IN TESTING REINFORCED POLYESTER PIPE. Amer. Soc. Mech. Eng., Paper No. 54-PET-14 (1954) September.

Quick tests and prolonged cycling tests are outlined for the testing of reinforced polyester pipe, as used by the Fibercast Corp. The quick tests are used primarily as a quality control check, although it is hoped that they may be correlated with actual values of working pressure and temperature. G. G. Wilson

PLASTIC PIPE—OVER THE HUMP. *Chem. Eng. News*, 33, 3062-64 (1955) July 25.

Of 1.4 million tons of synthetic resins produced in 1954, 20,000 tons was used in plastic pipe. Though small compared to 9 million tons ferrous pipe, this represents a six-fold increase in 5 years, and now several big firms have entered the field. Polyethylene plastic leads as pipe material, with 60% of the market with Kralastic (styrene-butadiene-acrylonitrile) and cellulose acelate butyrate tied for second (15% each). These are useful in handling water and foods, especially in high-corrosion services. Polyvinyl chloride, a European favorite is now entering the field. Commercial standards exist only for polyethylene pipe, but others are under commercial and laboratory tests. An increase of 23% or 7 million lbs is expected in 1955.

O. P. Brysch

Steam Piping

Sticha, E. A. MODERN PIPE MATERIALS—KEY TO TODAY'S BETTER STEAM STATIONS. *Power*, 99, 86-88, 188, 190 (1955) July.

The new structural steels are reviewed from the modern power plant piping viewpoint. Steam power plant temperature and pressure ratings are constantly being measured and steels are being developed to carry the measured loads. W. G. Bair

Welding

Boyd, G. M. THE EFFECTS OF RESIDUAL STRESSES IN WELDED STRUCTURES. *Engs. Digest*, 16, 329-32 (1955) July.

The authors contend that conclusive evidence has not been presented to show that residual stresses in welded structures are harmful. However, stress relieving is beneficial and it is suggested that it may be due to other metallurgical effects. W. G. Bair

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Gas Times
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Gas World
Heating, Piping and Air Conditioning

Independent Petroleum Association of America Monthly
Industrial and Engineering Chemistry
Industrial Finishing
Industrial Gas (American)
Industrial Gas (British)
Industrial Heating
Institute of Fuel (British). Journal
Institute of Gas Technology Publications
Institute of Petroleum (British). Journal
Institution of Gas Engineers. Bulletins, Communications and Transactions
Instruments

Jet Propulsion
Journal des Usines a Gaz
Journal of Applied Chemistry
Journal of Applied Mechanics
Journal of Applied Physics
Journal of Chemical Education
Journal of Chemical Physics
Journal of Engineering Education
Journal of Metals
Journal of Organic Chemistry
Journal of Petroleum Technology
Journal of Physical Chemistry
Journal of Research (National Bureau of Standards)
Journal of Scientific Instruments

Laboratory Practice
LP-Gas
Lubrication

Materials and Methods
Mathematical Aids
Mechanical Engineering
Mining Engineering

National Advisory Committee for Aeronautics, Reports
National Fire Protection Association Quarterly
National Gas Bulletin of Australia
National Petroleum News

Official Gazette of the U.S. Patent Office
Oil and Gas Journal
Oil, Paint and Drug Reporter
Optical Society of America. Journal

Petroleum
Petroleum Engineer
Petroleum Processing
Petroleum Refiner
Physics Today
Pipe Line Industry
Power
Producers Monthly
Public Utilities Fortnightly

Refrigerating Engineering
Research Reports
Review of Scientific Instruments
Revue Generale du Gaz
Rivista dei Combustibili

Science
Southern Gas Association Progress
Spectrochemica Acta
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by

C. G. von Fredersdorff

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